

REMARKS

By this amendment claim 1 has been amended to merely clarify the language thereof, claims 19-30 have been cancelled, and claims 31-34 have been added. Accordingly, claims 1-18 and 31-34 are pending in this application. No new matter has been added. In view of the remarks set forth below, Applicant requests the prompt re-examination and allowance of this application.

Restriction/Election

In the last Office Action, Applicant's election of claims 1-18, made in the reply filed March 01, 2005, was acknowledged and claims 19-30 were withdrawn from further consideration. Applicant has canceled claims 19-30 in this amendment.

Allowable Subject Matter

Applicant thanks the Examiner for indicating that claims 5-7, 9-12, and 15-18 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. It is noted that claim 9 was indicated in the Office Action Summary as being objected to along with claims 5-7, 10-12, and 15-18. Claim 9 was, however, not included with claims 5-7, 10-12, and 15-18 in paragraph 6 of the Office Action as being allowable if rewritten in independent form. As such, Applicant presumes that claim 9 was unintentionally omitted from paragraph 6 and would be allowable if rewritten in independent form.

Anticipation Rejections

In the Office Action mailed May 18, 2005, claims 1-4, 8, 13, and 14 were rejected under 35 U.S.C. §102(a) as being anticipated by U.S. Patent 6,678,584 to Junk et al.

("Junk"). Applicant respectfully traverses this rejection. A proper anticipation rejection requires each and every element set forth in the claim to be found in a single prior art reference. See MPEP § 2131. The anticipation rejection set forth in the last Office Action does not properly establish that each and every claimed element is disclosed in Junk.

Claim 1 includes, *inter alia*, a method for determining the operating health of a hydraulic system including determining a plurality of operating parameters, *determining* an estimated working condition value, *modifying* the estimated working condition value as a function of the operating parameters, and determining the operating health of the hydraulic system as a function of the working condition value. (Emphasis added). The method of claim 1 includes determining an estimated working value and modifying the estimated working condition as separate steps.

Junk discloses a method and apparatus for performing diagnostics in a pneumatic control loop. The method and apparatus includes a plurality of pressure sensors 84-86, and 88 sensing pressures and displacements at various locations within an actuator 12 and a positioner 14. See Fig. 2 of Junk. The method and apparatus further includes a diagnostics unit 18 programmed to receive feedback from sensors 84-86 and to calculate a mass flow rate based on the feedback according to a predetermined equation. See column 4, line 66, to column 5, line 63, of Junk. The diagnostics routine may use the mass flow calculations to identify leaks or blockages between a spool valve 26 of the positioner 14 and the actuator 12. See column 5, line 64, to column 6, line 23, of Junk.

Junk fails to disclose or suggest the method of claim 1. The method of Junk merely determines the mass flow rate; it does not modify the mass flow rate. For example, determining includes "to decide or settle conclusively, to establish or ascertain definitely, as after investigation or calculation" and modifying includes "to change in form or character." See *The American Heritage College Dictionary*, Third Edition, 1997. Accordingly, "determining" and "modifying" denote two different actions. As such, a single step in a method (e.g., the calculation of mass flow with an equation as disclosed in Junk) does not necessarily encompass both determining and modifying.

Junk explicitly states that the diagnostics routine uses feedback from the sensors 84-86 to estimate mass flow, may use the calculated mass flow to identify leaks, and that the mass flow may be approximated by using a specific equation. See column 4, line 66, to column 5, line 20, of Junk. By approximating the mass flow rate by using an equation, the diagnostics routine of Junk calculates the value of the mass flow rate, i.e., there is only one value of mass flow rate that will be determined from the equation set forth in Junk for a specific set of feedback from the sensors 84-86.

Junk is silent in regards to modifying the calculated mass flow rate, i.e., Junk is silent in regards to modifying an estimated working condition. It is presumed that the rejection set forth in the Office Action characterizes a re-determination of the mass flow rate, based on changed feedback from sensors 84-86, as modifying mass flow rate. A re-determination is not, however, modifying. The diagnostics unit 18 of Junk recalculates the mass flow using the predetermined equation with a subsequent set of feedback, e.g., a different set of operating parameters. Such a recalculation is merely a re-determination of the mass flow rate, not a modification of the mass flow rate. Similar

as above, there is only one value of mass flow rate that will be determined from the predetermined equation based on the subsequent set of feedback.

Furthermore, because the language of claim 1 utilizes different terms (determining and modifying) in separate steps, claim interpretation supports the argument that the two terms encompass different meanings. During patent examination, pending claims must be given their broadest reasonable interpretation consistent with the specification, however, the broadest reasonable interpretation must also be consistent with the interpretation that those skilled in the art would reach. See MPEP § 2111. The words of a claim must be given their plain meaning. See MPEP § 2111.01, I. The plain meaning is presumed to be the ordinary and customary meaning attributed by those of ordinary skill in the art, and may be evidence by a variety of sources, including the claims themselves and dictionaries. See MPEP § 2111.01, II.

Accordingly, Applicant respectfully asserts that construing two different terms, which have different meanings and which denote different actions, to encompass the same meaning within a single claim, improperly interprets those terms. As such, the terms “determining” and “modifying” should each be afforded their appropriate weight within the context of claim 1, as set forth above.

In view of the reasons set forth above, it is respectfully asserted that claim 1 is allowable. Rejected claims 2-4, 8, 13, and 14 depend from claim 1 and are allowable for at least the reasons set forth above as well as for their additional features.

Obviousness Rejections

In the last Office Action claims 2 and 3 were rejected under 35 U.S.C. §103(a) based on Junk in view of U.S. Patent Application Publication 2004/0167738 to Miller

("Miller"). Applicant respectfully traverses this rejection. A proper prima facie case of obviousness requires three elements: (1) there must be a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP § 2142.

Miller discloses a system and method for pump performance monitoring and analysis including a pump 20 and a system 44 including a plurality of sensors 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, and 76. See Fig. 1 of Miller. A processor 46 of the system 44 includes embedded software to determine the volumetric efficiency of pump 20 and whether or not leakage may occur at a piston packing or seal and determine cyclic fatigue. See paragraphs [0042] to [0047] of Miller. The system and method may further determine pressure variation during fluid compression within a piston cylinder chamber of pump 20 and fluid cavitation. See paragraphs [0054] and [0057] of Miller.

Regarding claims 2 and 3, the disclosure of Miller does not cure the deficiencies noted above with respect to independent claim 1. Specifically, Miller does not establish, *inter alia*, a method for determining the operating health of a hydraulic system including estimating a working condition and modifying the estimated working condition of the hydraulic system as a function of operating parameters as recited in claim 1.

Additionally regarding claim 2, Miller does not adequately teach the determination of a working condition value indicative of an effective bulk modulus value as recited in claim 2. Miller determines leakage past a piston within a cylinder based on the timing of the compression and decompression strokes of the cylinder as well

leakage relative to deviations in actual pressure data from representative pressure data. See paragraph [0054] of Miller. This is in contrast to an effective bulk modulus value as recited in claim 2. Effective bulk modulus of a hydraulic system reflects the overall effective compressibility of the operating fluid within the system. In contrast, Miller merely measures the time required to achieve compression or decompression of a piston cylinder arrangement to indicate leaks of the fluid past the piston.

In view of the reasons set forth above, it is respectfully asserted that claims 2 and 3 are allowable.

New Claims

Newly added claims 31-34 are believed allowable for at least the following reasons. First, neither Junk nor Miller disclose or teach a method for determining the operating health of a hydraulic system including predicting a working condition of the hydraulic system, as recited in independent claim 31. As set forth above, Junk calculates mass flow by a predetermined equation using feedback from the sensors. See column 5 lines 5-19 of Junk. This is in contrast to the recited language of independent claim 31; e.g., merely calculating is not predicting. As also set forth above, Miller determines, the volumetric efficiency of a hydraulic pump by measuring the changes in volume required to reach discharge operating pressure over a compression cycle. See paragraph [0054] of Miller. This is also in contrast to the recited language of independent claim 31; e.g., measuring is not predicting. As such, independent claim 31 is at least allowable for these reasons. Claims 32-34, which depend from independent claim 31, are also allowable for these reasons as well as for their additional features.

Conclusion

In view of the above, Applicant respectfully submits that claims 1-18 and 31-34 are in condition for allowance. Accordingly, Applicant respectfully requests reconsideration and re-examination of this application and timely allowance of the claims 1-18 and 31-34.

The Office Action contains characterizations of the claims and the related art, with which Applicants do not necessarily agree. Unless expressly noted otherwise, Applicant declines to subscribe to any statement or characterization in the Office Action.

If the Examiner believes a telephone conversation might advance prosecution, the Examiner is invited to call Applicant's undersigned representative at 202-408-4397.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account no. 06-0916.

Respectfully submitted,

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Dated: September 19, 2005

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